

Name: _____

at1124exam: Radicals and Squares (v805)

Question 1

Simplify the radical expressions.

$$\sqrt{27}$$

$$\sqrt{98}$$

$$\sqrt{12}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 3}}{3\sqrt{3}}$$

$$\frac{\sqrt{7 \cdot 7 \cdot 2}}{7\sqrt{2}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 3}}{2\sqrt{3}}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x+10)^2}{8} - 7 = 1$$

First, add 7 to both sides.

$$\frac{(x+10)^2}{8} = 8$$

Then, multiply both sides by 8.

$$(x+10)^2 = 64$$

Undo the squaring. Remember the plus-minus symbol.

$$x+10 = \pm 8$$

Subtract 10 from both sides.

$$x = -10 \pm 8$$

So the two solutions are $x = -2$ and $x = -18$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 14x = 72$$

$$x^2 - 14x + 49 = 72 + 49$$

$$x^2 - 14x + 49 = 121$$

$$(x - 7)^2 = 121$$

$$x - 7 = \pm 11$$

$$x = 7 \pm 11$$

$$x = 18 \quad \text{or} \quad x = -4$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 - 30x + 84$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 10x) + 84$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 10x + 25 - 25) + 84$$

Factor the perfect-square trinomial.

$$y = 3((x - 5)^2 - 25) + 84$$

Distribute the 3.

$$y = 3(x - 5)^2 - 75 + 84$$

Combine the constants to get **vertex form**:

$$y = 3(x - 5)^2 + 9$$

The vertex is at point (5, 9).